

## CLAIMS

We claim:

1. In a computer system that supports a visual user interface development tool, a method of centrally managing user interface state information for the visual user interface development tool such that behavior for one or more user interface components or the visual user interface development tool itself may be defined dynamically at development time, the method comprising acts of:

receiving a message generated within the visual user interface development tool;

sending the message to be checked against a centralized behavior stack for one or more behaviors to use in processing the message;

checking the centralized behavior stack containing currently available behaviors for processing messages to determine if a behavior is available; and

if a behavior is available on the centralized behavior stack, then passing the message to the available behavior for processing.

2. A method as recited in claim 1, wherein the behavior is available on the centralized behavior stack, and wherein the behavior is associated with the visual user interface development tool, as opposed to an individual user interface component within the visual user interface development tool.

3. A method as recited in claim 1, wherein the behavior is available on the centralized behavior stack, and wherein the behavior is associated with an individual user interface component within the visual user interface development tool, as opposed to the visual user interface development tool itself.

4. A method as recited in claim 3, wherein the individual user interface component comprises a third party component developed separately from the visual user interface development tool.

5. A method as recited in claim 3, wherein the behavior comprises asking the individual user interface component for any glyphs that are part of the individual user interface component.

6. A method as recited in claim 1, further comprising acts of:

receiving the behavior from a component within the visual user interface development tool during development time; and

pushing the behavior on the centralized behavior stack.

7. A method as recited in claim 1, wherein no behavior is available on the centralized behavior stack for processing the message, the method further comprising an acts of:

checking for a successfully hit tested glyph with a corresponding glyph behavior for the message; and

if available, passing the message to the glyph behavior of the successfully hit tested glyph.

8. A method as recited in claim 1, further comprising an act of receiving one or more glyphs with corresponding glyph behavior from a component within the visual user interface development tool during development time, wherein each of the one or more glyphs is capable of hit testing and painting itself.

9. For a computer system that supports a visual user interface development tool, a computer program product comprising one or more computer readable media carrying computer executable instructions that implement a method of centrally managing user interface state information for the visual user interface development tool such that behavior for one or more user interface components or the visual user interface development tool itself may be defined dynamically at development time, the method comprising acts of:

- receiving a message generated within the visual user interface development tool;
- sending the message to be checked against a centralized behavior stack for one or more behaviors to use in processing the message;
- checking the centralized behavior stack containing currently available behaviors for processing messages to determine if a behavior is available; and
- if a behavior is available on the centralized behavior stack, then passing the message to the available behavior for processing.

10. A computer program product as recited in claim 9, wherein the behavior is available on the centralized behavior stack, and wherein the behavior is associated with an individual user interface component within the visual user interface development tool, as opposed to the visual user interface development tool itself.

11. A computer program product as recited in claim 9, the method further comprising acts of:

- receiving the behavior from a component within the visual user interface development tool during development time; and
- pushing the behavior on the centralized behavior stack.

12. A computer program product as recited in claim 11, wherein the behavior corresponds to a particular action either being performed or to be performed on a user interface component within the visual user interface development tool, the method further comprising an act of popping the behavior off the centralized behavior stack when the particular action is completed.

13. A computer program product as recited in claim 12, wherein the centralized behavior stack enforces the existence of a single state for the particular action.

14. A computer program product as recited in claim 9, wherein no behavior is available on the centralized behavior stack for processing the message, the method further comprising an acts of:

checking for a successfully hit tested glyph with a corresponding glyph behavior for the message; and

if available, passing the message to the glyph behavior of the successfully hit tested glyph.

15. A computer program product as recited in claim 9, the method further comprising an act of receiving one or more glyphs with corresponding glyph behavior from a component within the visual user interface development tool during development time, wherein each of the one or more glyphs is capable of hit testing and painting itself.

16. A computer program product as recited in claim 9 wherein the visual user interface development tool comprises an adorning window that intercepts all messages directed to the visual user interface development tool.

17. A computer program product as recited in claim 16, wherein the one or more glyphs are organized into one or more adorning layers.

18. A computer program product as recited in claim 17, the method further comprising an act of disabling at least one of the one or more adorning layers.

19. In a computer system that supports a visual user interface development tool, a method of centrally managing one or more behaviors that are dynamically defined at development time for a component within the visual user interface development tool or for the visual user interface development tool itself, the method comprising steps for:

catching a message generated in response to user input within the visual user interface development tool;

routing the message to determine any behaviors that are available for use in processing the message;

determining if a centralized and extensible behavior store that contains currently available behaviors includes one or more behaviors for processing the message; and

if a behavior is included within the centralized and extensible behavior store, then using the behavior to process the message.

20. A method as recited in claim 19, wherein the behavior is available on the centralized behavior stack, and wherein the behavior is associated with an individual user interface component within the visual user interface development tool, as opposed to the visual user interface development tool itself.

21. A method as recited in claim 19, further comprising:

an act of receiving the behavior from a component within the visual user interface development tool during development time; and

a step for adding the behavior to the extensible behavior store.

22. A method as recited in claim 19, wherein no behavior is available on the centralized behavior stack for processing the message, the method further comprising steps for:

determining if a successfully hit tested glyph with a corresponding glyph behavior exists for the message; and

if the successfully hit test glyph exists, using the corresponding glyph behavior to process the message.

23. A method as recited in claim 22, wherein no successfully hit test glyph with corresponding glyph behavior is available for the message.

24. A method as recited in claim 19, further comprising an act of receiving one or more glyphs with corresponding glyph behavior from a component within the visual user interface development tool during development time, wherein each of the one or more glyphs is capable of hit testing and painting itself.

25. A method as recited in claim 19, wherein the message comprises one of a user event, a mouse message, and a keyboard message.

26. A method as recited in claim 19, wherein the centralized and extensible behavior store contains all currently available behaviors.



27. For a computer system that supports a visual user interface development tool, a computer program product comprising one or more computer readable media carrying computer executable instructions that implement a method of centrally managing one or more behaviors that are dynamically defined at development time for component within the visual user interface development tool or for the visual user interface development tool itself, the method comprising steps for:

catching a message generated in response to user input within the visual user interface development tool;

routing the message to determine any behaviors that are available for use in processing the message;

determining if a centralized and extensible behavior store that contains currently available behaviors includes one or more behaviors for processing the message; and

if a behavior is included within the centralized and extensible behavior store, then using the behavior to process the message.

28. A computer program product as recited in claim 27, wherein the behavior is available on the centralized behavior stack, and wherein the behavior is associated with an individual user interface component within the visual user interface development tool, as opposed to the visual user interface development tool itself.

29. A computer program product as recited in claim 27, the method further comprising:

an act of receiving the behavior from a component within the visual user interface development tool during development time; and

a step for adding the behavior to the extensible behavior store.

30. A computer program product as recited in claim 27, wherein no behavior is available on the centralized behavior stack for processing the message, the method further comprising steps for:

determining if a successfully hit tested glyph with a corresponding glyph behavior exists for the message; and

if the successfully hit test glyph exists, using the corresponding glyph behavior to process the message.

31. A computer program product as recited in claim 27, wherein the behavior defines a new custom behavior previously unavailable within the visual user interface designer.

32. A computer program product as recited in claim 27, the method further comprising an act of receiving one or more glyphs with corresponding glyph behavior from a component within the visual user interface development tool during development time, wherein each of the one or more glyphs is capable of hit testing and painting itself.

33. A computer program product as recited in claim 32, wherein the one or more glyphs are organized into one or more adorning layers.

34. A computer program product as recited in claim 33, the method further comprising an act of disabling at least one of the one or more adorning layers.

35. A computer program product as recited in claim 32, wherein the one or more glyphs comprise at least one custom glyph for the component.

36. A computer program product as recited in claim 32, wherein the message corresponds to at least one of a hit test message and a paint message.

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37. A computer program product comprising one or more computer readable media carrying computer executable instructions that centralizes component behavior for a visual user interface development tool and permits a component to define at development time one or more custom behaviors that are specific to the component itself or applicable the visual user interface development tool, the computer executable instructions comprising:

an extensible behavior stack that contains one or more development time specified behaviors for the visual user interface development tool or a component within the visual user interface development tool;

a extensible collection of one or more adorners, each containing one or more development time specified glyphs capable hit testing and painting themselves, wherein at least one of the one or more glyphs includes a reference to a glyph behavior to invoke when a successful hit test has been determined; and

a message router that routes one or more received messages to either the extensible behavior stack or the extensible collection of one or more adorners.

38. A computer program product as recited in claim 37, the computer executable instructions further comprising an adorer window that intercepts one or more messages directed to the visual user interface development tool.

39. A computer program product as recited in claim 37, wherein the message router routes a received user event message, a received mouse message, or a received keyboard message to the extensible behavior stack.

40. A computer program product as recited in claim 37, wherein the message router routes a received a received hit test message or a received paint message to the extensible collection of one or more adorners.

41. A computer program product as recited in claim 37, wherein the one or more adorners organize the one or more development time specified glyphs into layers which can be independently disabled and enabled.

42. A computer program product as recited in claim 37, wherein the component within the visual user interface development tool comprises a third party component developed separately from the visual user interface development tool.